2 Sheets - Sheet 1.

L. P. Jenks.

Piston Meter.

No. 62,423. Patented Feb. 26, 1867.

Fig. 1.

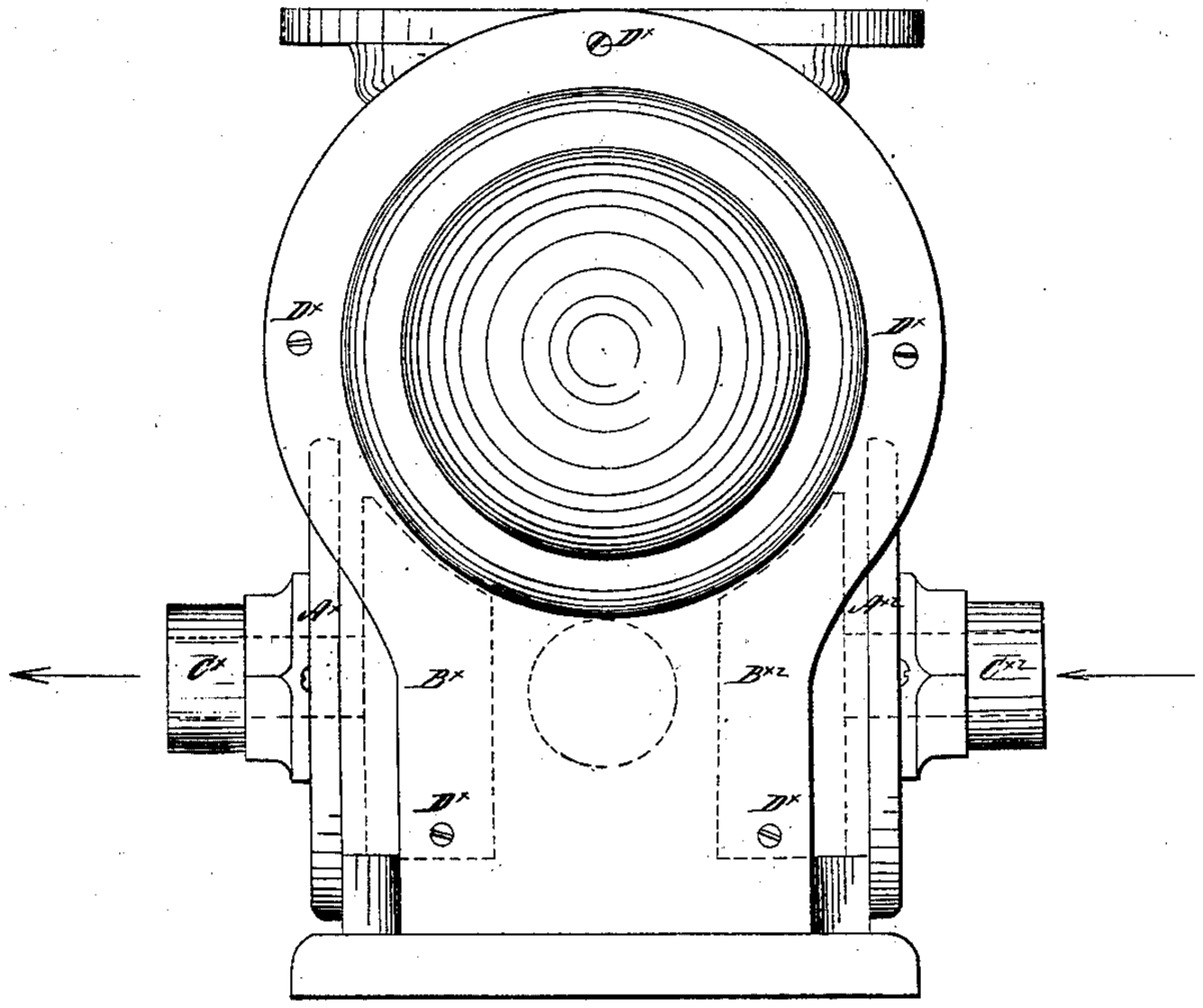

Fig. 2.

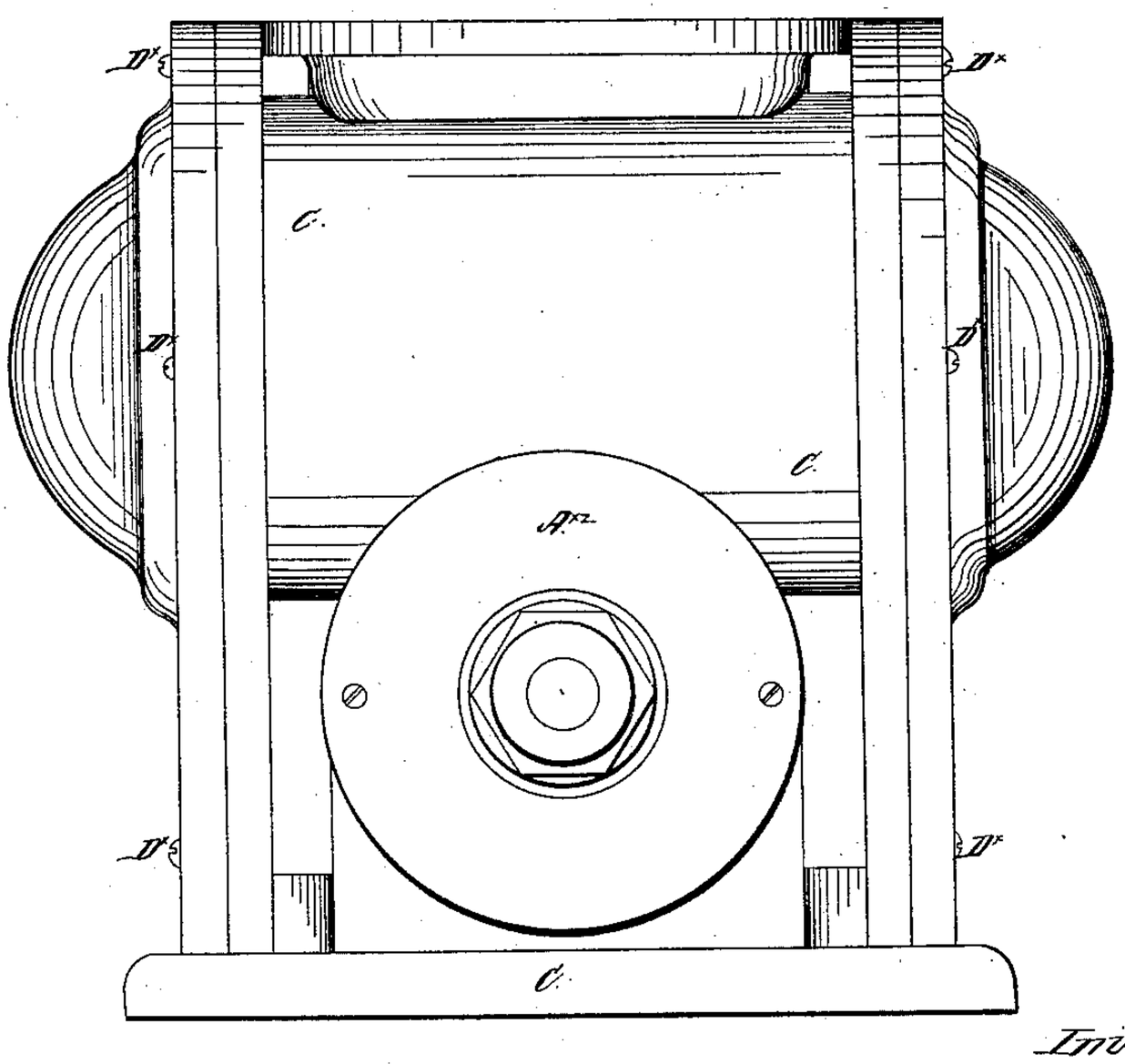

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Fig. 5.

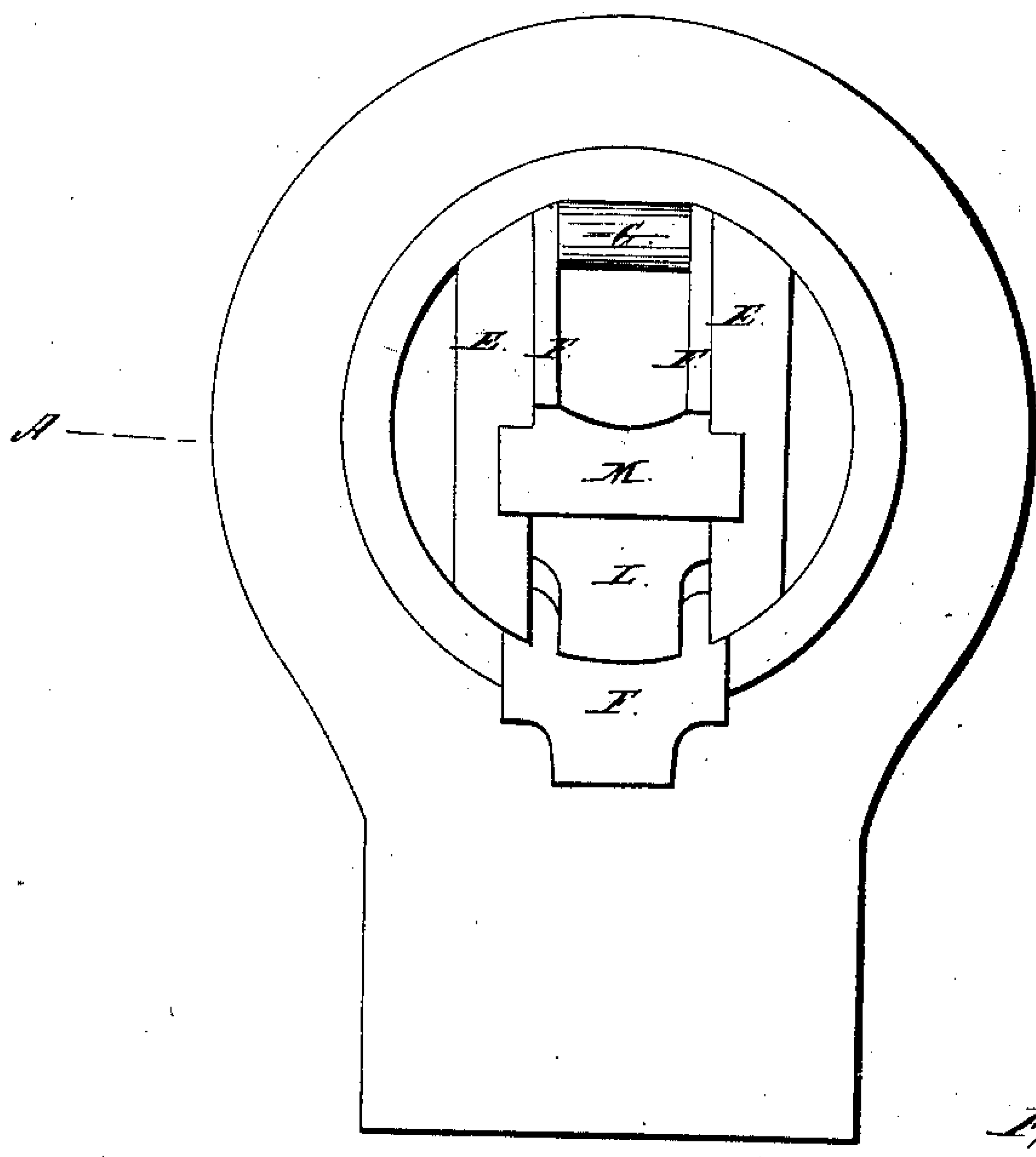


Fig. 6.

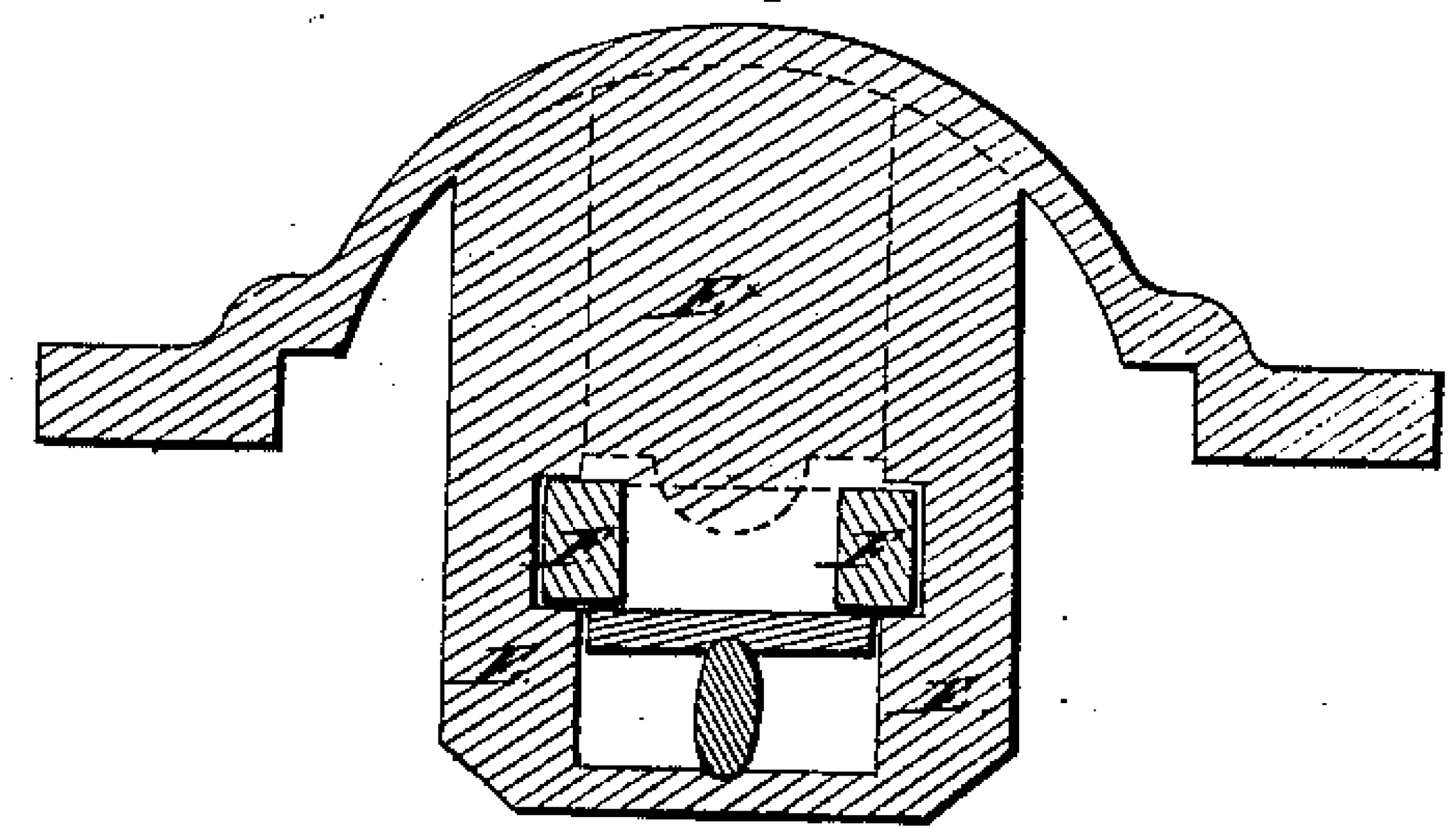


Fig. 4.

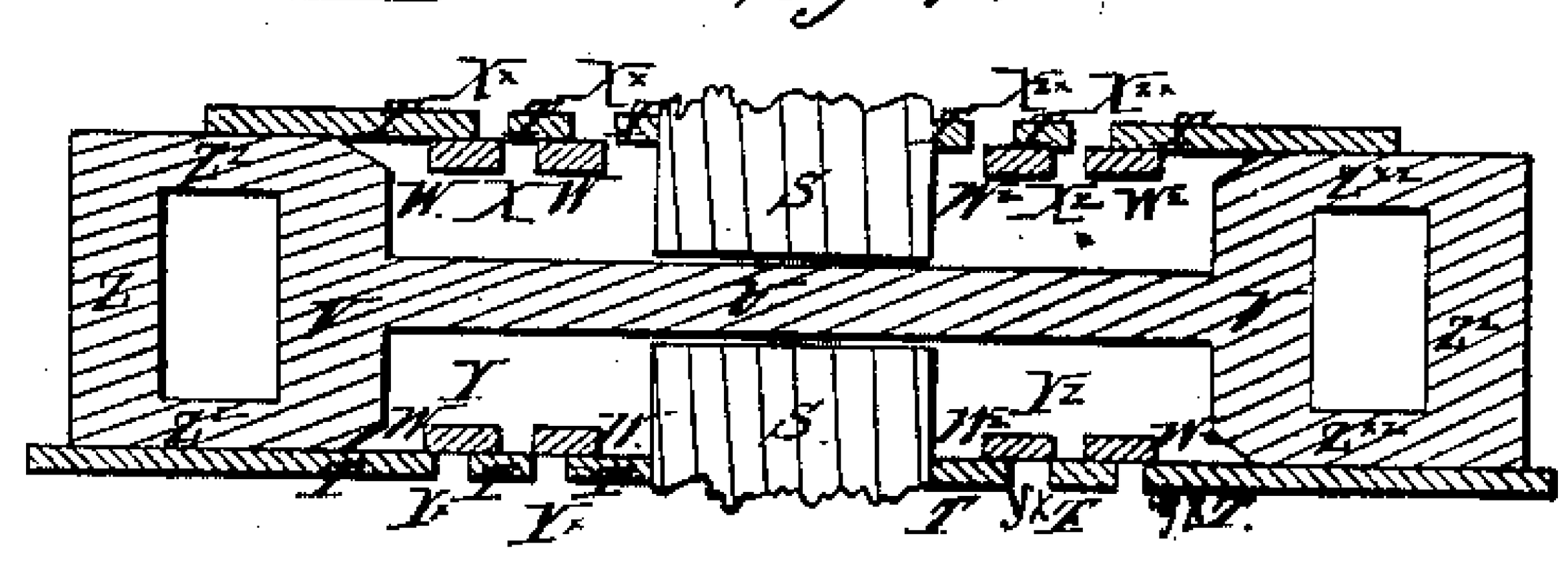
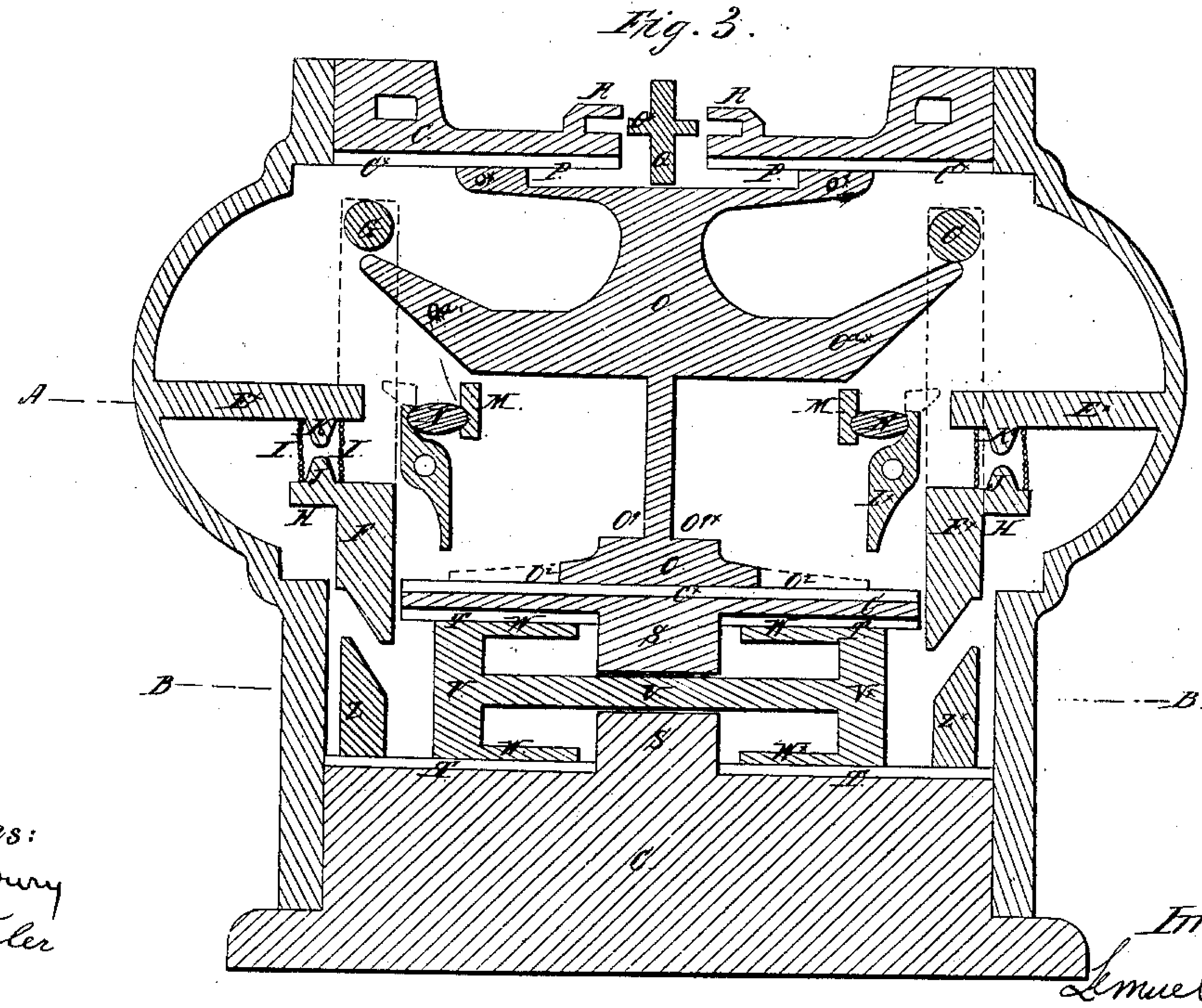


Fig. 3.



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United States Patent Office.

LEMUEL P. JENKS, OF BOSTON, MASSACHUSETTS, ASSIGNOR TO EDWIN A. EATON, OF THE SAME PLACE.

Letters Patent No. 62,423, *dated February* 26, 1867.

IMPROVEMENT IN WATER-METERS.

The Schedule referred to in these Letters Patent and making part of the same.

TO ALL WHOM IT MAY CONCERN:

Be it known that I, LEMUEL P. JENKS, of the city of Boston, county of Suffolk, and State of Massachusetts, have invented a new and improved Machine for the Purpose of Measuring Water and other Liquids, and for a Motor; and I do hereby declare that the following is a full and exact description of the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon. And in the drawings annexed—

Figure 1, plate 1, is a view of the end of my machine.

Figure 2, plate 1, is a side view.

Figure 3, plate 2, is a vertical section through the centre of fig. 2, plate 1.

Figure 4, plate 2, is a horizontal section of part of fig. 3, at the lines B B, hereinafter more particularly explained.

Figure 5, plate 2, is a view of a cylinder-head, (seen from the inner side;) and

Figure 6, plate 2, is a section of fig. 5, at the line A.

In the drawings annexed, C C C, figs. 2 and 3, show (from the side) a cylinder, lying horizontally, and supported by a bottom or standard attached to it, being cast in the same piece. D, fig. 1, and D D, figs. 2 and 3, represent, respectively, one or two cylinder-heads, which swell out in a hemispherical projection from the direction of the centre of the cylinder C C C. These cylinder-heads are firmly fastened by the screws D× D× D× D× D×, figs. 1 and 2, to the respective ends of the cylinder C C C, and bear, projecting from the inner surface, (into the cylinder C C C,) a frame called the "hammer-frame," consisting of two upright slabs or bars of metal, E E, figs. 5 and 6, connected by a horizontal slab of metal, E× E×, fig. 3, and E×, fig. 6, called the "upper spring slab," also projecting from and firmly joined to the inner side of the cylinder-heads. These upright slabs E E bear in the inner sides, opposite to each other respectively, a perpendicular groove, seen in fig. 6, plate 2. These grooves bear what is called the hammer, F F, figs. 3 and 6, and F F F, fig. 5, which is a slab of metal, sliding up and down in the aforesaid grooves, and being a solid slab at the bottom, (as seen in fig. 5,) with an inclined plane thereat, (see fig. 3,) and resolving itself above into two arms of a fork, and seen in figs. 5 and 6. At the top of these arms, (and, consequently, at the top of the hammer,) is fixed, loosely rotating, a roller, G G, fig. 3, and G, fig. 5. From just below the middle of the hammers, projects horizontally toward the respective cylinder-heads which bear them, a shelf, H H, seen in fig. 3, bearing each, on its upper side, a perpendicular knob or conical pr jection, J J, fig. 3. These knobs, called the "lower spring knobs," pass up through the centre each of a spiral spring, II, II, seen in section in fig. 3, plate 2, which springs these knobs hold in place. From the lower side of the "upper spring slab," E× E×, fig. 3, projects downwards a knob, K K, fig. 3, called the "upper spring knob," which assists in holding in place the spring which surrounds it. L L, fig. 3, are two latches or pawls, playing loosely on a bearing or shaft, (seen in fig. 3,) which shafts are supported by the hammer-frame E E, fig. 5. M M, fig. 3, (M, fig. 5, and M, fig. 6,) are two bars, called the "latch spring bars." These are a portion of the hammer-frames, and have each a cavity on the inner side, (see figs. 3 and 6,) by which is retained in place a small India-rubber (or other) spring, N N, fig. 3, and N, fig. 6, called the "latch spring," the other end of which fits into a hollow or cavity in the upper part of the latches L L, (see figs. 3 and 6.) By means of these latch springs the upper parts or ends of the latches L L are pressed into a notch in the outer side of the hammers F F, (see fig. 3,) and thus the hammers (notwithstanding the tendency of the springs II, II, to drive them down) are held in place. O O, fig. 3, is a sectional view of the piston, which plays back and forward in the cylinder C C. There intervenes, however, between the piston and the cylinder C C, another cylinder, C× C× C×, fig. 3, supposed to be of Babbitt metal, or other metal not readily oxidizable by water, and cast in a molten state, into the cylinder C C. The use of this Babbitt metal cheapens the cost of boring the cylinder, and prevents the rusting which would occur if the bare iron cylinder C C were solely used. The piston O O is surrounded at its edges by a cylinder firmly attached to it, O^x O^x O^z O^z, fig. 3, cast in the same piece, which is called the "piston cylinder," and is cut away at its lower part, at its ends, at O^z O^z, fig. 3, sufficiently to allow the passage of the piston cylinder to its extreme point of play without interfering with the passage of the hammers F F up and down. The Babbitt cylinder C×, &c., and the main cylinder C, are also cut away at this

point to allow the hammers to play up and down. From each side of the pistion O, and above the axis of the cylinder C C, (see fig. 3,) and cast upon the piston, is a piece of metal, O^a O^{ax}, projecting horizontally half its length, and then bending upward at an angle of about forty-five degrees, (thus having each, an inclined plane on its upper surface,) called the "hammer horn." The width of these hammer horns is just sufficient to permit their passage through the forked arms, (see fig. 5,) of the hammers. O^q O^{qx}, fig. 3, are two shelves, knobs, or projections, on each side of the lower part of the piston, and are called the "latch knobs." In the top of the piston cylinder O^x, &c., is a slot, (see fig. 3,) at P P, which slot does not pass entirely through the piston cylinder, and is sufficiently wide to admit the passage back and forward of the pin Q, fig. 3, called the "clock pin." This clock pin has upon it a circular disk or button, $Q^\times$ $Q^\times$, fig. 3, which button plays in a slot formed in the projection R R, seen in section in fig. 3, and thus keeps the clock pin Q in place. Below the main cylinder, and with its centre in the same perpendicular line, (see fig. 1, plate 1,) is a tubular aperture or cylindrical hole, cast in the mass of metal of which the main cylinder forms a part, called the "valve tube." This valve tube is lined with Babbitt or other metal not easily oxidizable, supposed to be cast in it, and making the two cylinders TT, TT, seen in section in fig. 3, and T T, &c., fig. 4. This valve tube has running across its centre a block of metal, S S, figs. 3 and 4, forming a diaphragm, which divides the right-hand portion of the valve tube from the left-hand portion. This portion S S is fixed firmly in its position, and has running through its centre, coincident with the axis of the valve tube, a small cylindrical aperture, through which runs back and forward a rod or shaft, U, figs. 3 and 4, called the "valve shaft," which has attached to it, at each end, a button, V $V^\times$, figs. 3 and 4, called the "valve buttons." To the sides of the respective buttons V $V^\times$, which are nearest the block S S, is respectively, joined by its end, a short cylinder, W W $W^\times$ $W^\times$, fig. 3, and W, &c., fig. 4, called the "valve cylinders." These play back and forward in the valve tubes. On the upper side of fig. 4, (being the further side in figs. 2 and 3, and the right-hand side in fig. 1,) on the valve cylinders W, &c., are two slots marked X X^z, fig. 4, near the end of the cylinder, called the "valve induction slots;" and through the valve-tube lining T, &c., at the same side, are two apertures, called the "valve-tube induction slots," marked X^x X^x, X^{xz} X^{xz}, fig. 4. On the lower side of the valve tube in fig. 4 are seen, on each side of the block S S, two slots marked Y^x Y^x, Y^{xz} Y^{xz}, in the valve-tube lining, called the "valve-tube eduction slots." Z $Z^\times$, called the "valve inclined planes," figs. 3 and 4, are each a button or disk of circular shape, of same size as the bore of the valve-tube lining, and chamfered off, as seen in fig. 3, in the shape of an inclined plane. These inclined planes are connected and firmly fixed (being cast in the same piece) with the valve buttons V $V^\times$ by (each) two bars, marked Z^{xz} Z^{xz}, Z^z Z^z, in fig. 4. A^x A^{xz}, fig. 1, and A^{xz}, fig. 2, are disks (whose section is seen in dashed lines in fig. 1,) fitting in and firmly fastened (by screwing in or by small screws on the flanges) to (each) an aperture on the side of the valve tube, marked B^x B^{xz} in fig. 1, (defined by dashed lines.) C^x C^{xz}, fig. 1, and C^{xz}, fig. 2, are short pipes cast on the disks A^x A^{xz}, (and generally forming a male screw.) These pipes and disk are pierced each with a horizontal hole, (seen in dashed lines in fig. 1,) through which holes the water comes in and goes out. These disks A^x and A^{xz}, are called the pipe disks, and through the right-hand one (in fig. 1) the "induction disk," the water comes in, and through the left-hand one (in fig. 1) the "eduction disk," the water goes out. And the operation of my machine is as follows:

In figs. 3 and 4 the piston is seen in the middle, and the valves are represented in the same position; the water being thus neither coming in nor going out. The meter being placed on its side, say the side which is at the right hand in figs. 2 and 3, is shaken or bumped heavily. This process shakes the piston and the valves down on that side as far as they will go. The induction disk and pipe being then (by any convenient method) connected with the hydrant pipe, the water is let on. It comes in, in the direction of the arrow on the right-hand side in fig. 1, passes through two slots in left-hand side of chamber B^{xz}, fig. 1, (which slots are opposite to and in continuation of the two valve-tube induction slots X^{xz} X^{xz}, fig. 4. Here, the right eduction slots Y^{xz} Y^{xz}, fig. 4, being closed, (by the same arrangement of position of the valves which opens the valve-tube induction slots on that side of the block S S, the left induction slots $X^\times$ $X^\times$ being closed, and the left eduction slots $Y^\times$ $Y^\times$ being open,) the water passing through the valve-tube induction slots X^{xz} X^{xz}, and filling the valve tube on that side (of the block S S) proceeds upward and presses on the right-hand side, (see fig. 3,) of the piston. The piston, yielding, moves to the left, the right-hand end of the slot P, fig. 3, pressing against the clock pin Q, and moving it to the left, (the recession of the piston moving the clock pin back again,) thus actuating gearing of pawl and ratchet-wheel connected with cog-wheels and dial-plate to register the discharge of water. This gearing and clock-work being in no way different from that in common use, it has not been thought necessary to represent it. The piston having reached its extreme position on the left, and the left-hand hammer horn having passed under the left hammer roller, the left latch knob O^q strikes against the lower part of the left latch and withdraws the top part of the latch from its notch in the side of the left hammer F. The left spring I I, then expanding drives the hammer down with force, and the inclined plane at the bottom of the hammer coming in contact with the left inclined plane Z, fig. 3, of the valve, the latter yields and moves back toward the left, carrying with it, by means of the valve shaft U, the right-hand valve. This shifting of the two right and left valves opens the left induction slots, and the right eduction slots, before closed, and also closes the left eduction and right induction slots, previously open. The water, then, ceasing to come in at the right-hand side of the piston, enters at the left-hand side, and, going up, presses the piston toward the right side. The right eduction slots being open, the water on that side of the piston is pressed out through them, and passing on to the chamber $B^\times$, (see fig. 1,) is ejected in the direction of the arrow seen on that side. As the piston moves from the extreme left to the right-hand side, the inclined plane of the hammer horn O^a, on that side, lifts, by means of the roller G, the hammer on that side to its position, and the top of the latch L, snapping into its notch retains it there. The piston going to the right, the same process just described, of pressing the latch knob O^{qx} on that side, on the bottom of the latch $L^\times$, causes the hammer $F^\times$ to strike upon the valve inclined

plane $Z^{\times}$, when the valves are again shifted, and the water coming in, as first described, the piston proceeds back again, the hammer horn O^{ax}, resetting the hammer $F^{\times}$, (as its mate did on the opposite side,) and thus the action continues as long as the water runs. The dial above (not shown, but above adverted to,) announces, on consultation, how much water has been discharged. And I usually arm the hammer inclined planes and the valve inclined planes with steel. And I usually set in a piece of steel in the side of the hammers to contain the notch into which the tops of the latter go. And I prefer to make the latches and also the hammer rollers either of steel or of bell-metal. I sometimes connect to the piston a horizontal shaft, like a piston-rod, passing through the cylinder-head on the side on which the piston-rod is fixed, and use the same as a motor, propelled by water power. For this purpose I place the latches lower down, and bore a cylindrical hole, horizontally through (or cut a groove, semicircular in section upon) the "upper spring slab" $E^{\times}$, which slab is then made thicker than is seen in the drawing.

And what I claim herein as of my own invention, and desire to secure by Letters Patent, is—

1. I claim the arrangement in a meter or a moter, of two valves, each one being both for induction and eduction, the said valves being connected together, and acting alternately in separate chambers or valve tubes, when the same are used in reciprocal action with a piston and actuated by percussion, all substantially as and for the purpose described.

2. I claim actuating the valves of a meter or of a motor, by the alternate percussion of two hammers upon inclined planes connected with the valves; the hammer being operated by the motion of a piston, all substantially as and for the purpose described.

3. I claim the arrangement, in combination with the hammers, of the pawls or latches, with their respective springs, to retain the hammers at their highest elevation, when the same are actuated by the piston, discharging said pawls, all substantially as and for the purpose described.

4. I claim, with a meter or motor, the device of the horns or projecting inclined planes, attached to the piston, for the purpose of raising the hammers, when the same operate substantially as and for the purpose described.

5. I claim the arrangement in a meter or in a motor, of a piston-containing cylinder, and a valve-containing cylinder, when the valves are operated by percussion, all substantially as and for the purpose described.

6. I claim the general arrangement and construction of the machine represented, all substantially as and for the purpose described.

LEMUEL P. JENKS.

Witnesses:

EDWIN R. EATON,

W. B. GEORGE.